Dec. 8, 1925. 1,564,635

H. H. SMITH

LOCK

Filed March 31, 1924

Fig. 1.

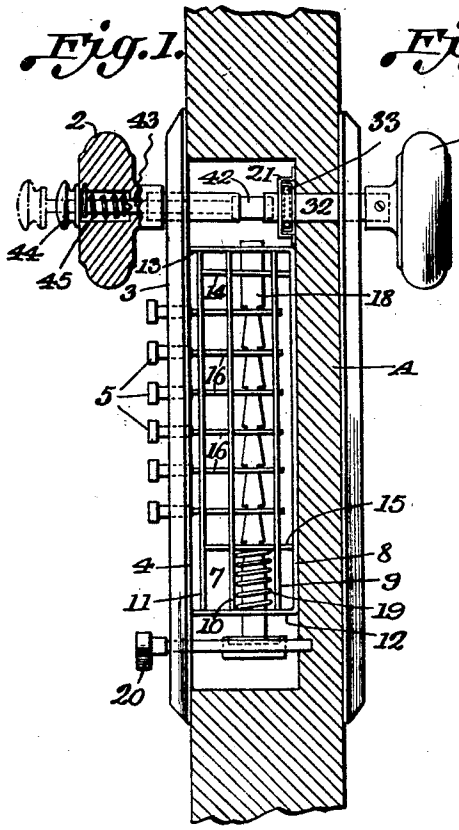


Fig. 2.

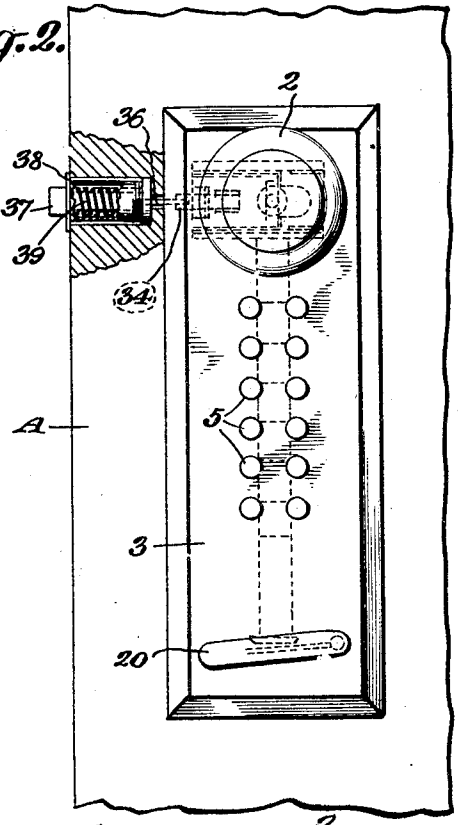


Fig. 3.

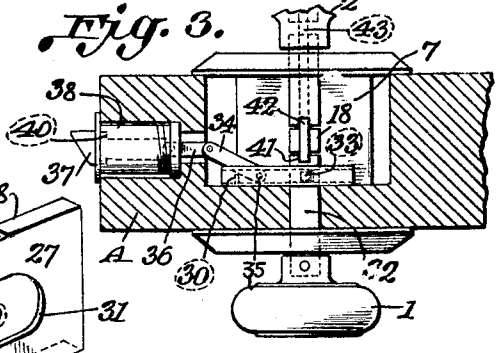
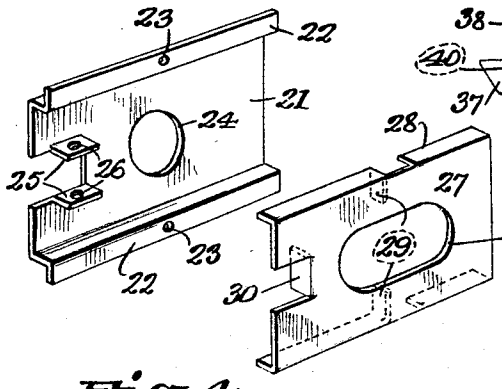


Fig. 4.



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Patented Dec. 8, 1925. 1,564,635

UNITED STATES PATENT OFFICE.

HURLEY H. SMITH. OF ELKHART, INDIANA.

LOCK.

Application filed March 31, 1924. Serial No. 703,173.

To all whom it may concern:

Be it known that I, HURLEY H. SMITH, a citizen of the United States, and resident of Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Locks, of which the following is a specification.

My invention relates to combination locks of the type shown in my prior Patent 1,430,332, Sept. 26, 1922, and has for its object certain improvements in the construction there shown.

Said patent discloses a structure in which the spindles of the inner and the outer door knobs are separate and that of the inner knob is connected to the bolt of the door. When unlocked, the spindle of the outer knob can be moved into engagement with the spindle of the inner so that the door bolt may be moved by turning the outer knob. A locking bolt is adapted to be moved into position between the two spindles and prevent the said engaging movement, so that the door cannot be opened by turning the outer knob. This locking bolt is held in position by means which may be released by pressing certain buttons of a series depending upon the combination for which the lock has been set.

An object of my invention is to provide improved mechanism for transmitting movement of the inner spindle to the door bolt which will enable the door to be opened by turning the knob in either direction.

Another object is the provision of an improved means for connecting the outer spindle to the inner when the locking bolt is moved to released position.

Other objects will be apparent from the following detailed description and the appended claims.

In the drawings:

Figure 1 is a vertical section through the lock.

Figure 2 is an elevation from the outside of the door with a portion in section.

Figure 3 is a transverse section with parts in elevation.

Figure 4 is a perspective view of fixed and sliding plates forming part of the mechanism for transmitting movement of the inner spindle to the door bolt.

An inner knob 1 is carried by the frame A of the door and the outer knob 2 is mounted in a plate 3 of suitable material to which is preferably attached on the inside another plate 4. Keys 5 are mounted to slide in the plates 3 and 4 as shown. In a cut out portion of the door is located a frame 7 which has longitudinal plates 8, 9, 10 and 11, and cross plates 12, 13, 14 and 15, the cross plates 12 and 13 being preferably integral with the longitudinal plate 8, though not necessarily so. Sliding plates or bolts 16 corresponding in number to the keys 5 are mounted to slide through the longitudinal plates 9, 10 and 11. A locking bolt 18 is guided for sliding movements in the plates 12 and 13 and has shoulders to cooperate with cut out portions in the bolts 16. A spring 19 normally throws the bolt 18 downward to the Figure 1 position, and a setting device 20 is provided to move it upward into a position in which it lies between the adjacent ends of the spindles of the knobs 1 and 2 and prevents their engagement. This structure and the operation thereof is or may be, the same as that described in my prior patent and needs no further definite description here.

To the inner wall of the cut out portion of the door is attached a plate 21 of the form shown in Figure 4, having flanges 22 provided with holes 23 for attaching screws; a central opening 24 for the passage of the spindle, and inwardly bent ears 25 provided with holes 26 for a purpose hereinafter described. Slidably mounted within this plate is an inner plate 27 having sides 28 from which are bent inwardly two ears 29 and having a third ear 30 bent inwardly from one end. This plate 27 is provided with an elongated opening 31 for the passage of the door spindle.

The spindle 32 to which the inner knob is fastened has near its inner end a pin 33 set transversely therein, the ends of which pin rest against the ears 29 of the plate 27. Consequently when the knob is turned in either direction, one end of the pin will engage one of the ears 29 and slide the plate lengthwise within the plate 21, the elongated opening 31 permitting this sliding movement.

An arm 34 is pivoted on a pin 35 mounted in the ears 25 of the plate 21. This arm 34 is pivoted to a link 36 in turn pivoted to the door bolt 37 which is mounted to slide in a sleeve 38 countersunk in the door frame and normally forced outwardly by a spring 39 bearing against the bottom of the sleeve and against a shoulder 40 on the bolt. When a

turning of the knob produces a sliding movement of the plate 27 as above described, the ear 30 will come against the arm 34 and as this is pivoted at its inner end, it will be cammed inwardly thus moving the door bolt to the right in Figure 3. Upon release of the knob, the spring 39 will return the parts to normal position.

The inner end of the spindle 32 has a slot or groove 41 in the end therefor, with which is adapted to cooperate the correspondingly formed end 42 of a plunger 43 which is mounted to slide within the outer knob 2 and its spindle and terminates at the outer end in a button 44. A spring 45 surrounding the plunger 43 within the knob 2 serves to retain it in desired position. Obviously this spring may be arranged to throw the plunger outward to dotted line position or to hold it in the full line position of Figure 1.

When it is desired to lock the door, the plunger 43 is moved to disengage its end 42 from the groove 41, and the finger piece 20 is operated to set the locking bolt in operative position. Its upper end will then lie between the end 42 of the plunger 43 and its cooperating groove 41 in the inner spindle, and the door bolt cannot be operated by the outer knob. When the locking bolt 18 is released by pressure on the buttons 5 of the combination for which it is set, the spring 19 will return it to inoperative position, and the plunger 43 may then be pushed in to engage the inner spindle, whereupon a turning of the outer knob will result in a sliding movement of the plate 27 and consequent movement of the door bolt 37.

It is obvious that so far as the present invention is concerned, the precise arrangement of the locking bolt 18 and the means for operating the same is entirely immaterial. Various details may be changed and the usual mechanical expedients such as adjustable collars for application to doors of different thicknesses may be employed wherever desired.

In general it is to be understood that the invention is limited only by the scope of the appended claims.

I claim as my invention:

1. Locking mechanism for doors comprising an inner knob and spindle therefor, a fixed plate, a sliding plate adjacent thereto, said spindle passing through both plates, a transverse pin in said spindle, means on said sliding plate engaged by said pin when the spindle is turned, a door bolt, means connecting the fixed plate to the door bolt and pivoted to both, and means operated by the sliding plate and engaging said connecting means.

2. Locking mechanism comprising a rotatable spindle, a fixed plate, a sliding plate adjacent thereto, said spindle passing through both plates, engaging means on said spindle, cooperative engaging means on said sliding plate, a spring pressed bolt, and means connecting the bolt to the fixed plate and pivoted to both, said means operated by the sliding plate.

3. Locking mechanism comprising a rotatable spindle, a fixed plate, a sliding plate adjacent thereto, said spindle passing through both plates, engaging means on said spindle, cooperative engaging means on the sliding plate, a link pivoted on the fixed plate, a bolt to which said link is pivoted, and means on the sliding plate to engage said link intermediate its ends when the plate moves.

4. Locking mechanism for doors comprising inner and outer knobs, spindles therefor, the inner ends of said spindles being spaced apart at all times when locked, a door bolt operated by the inner spindle, a locking bolt adapted to be positioned between the inner ends of the spindles, a plunger sliding through the outer knob and spindle, and means whereby said plunger may engage the inner spindle when the locking bolt is in inoperative position.

5. Locking mechanism for doors comprising inner and outer knobs, spindles therefor, the inner ends of said spindles being spaced apart at all times when locked, a door bolt operated by the inner spindle, a plunger sliding through the outer knob and spindle, and cooperative engaging means on the inner end of the plunger and the inner end of the inner spindle.

6. Locking mechanism for doors comprising inner and outer knobs, spindles therefor, the inner ends of said spindles being spaced apart at all times when locked, a door bolt operated by the inner spindle, a plunger sliding through the outer knob and spindle, cooperative engaging means on the inner end of the plunger and the inner end of the inner spindle, and means for preventing such cooperative engagement when it is desired to lock the door.

In testimony whereof, I have hereunto subscribed my name.

HURLEY H. SMITH.